भारतीय मानक

Indian Standard

IS 3064 : 2018

हाथ से बने ड्राइंग पेपर — विशिष्टि

(दूसरा पुनरीक्षण)

Hand-made Drawing Paper — Specification

(Second Revision)

ICS 85.080

© BIS 2018

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुरशाह ज़फर मार्ग, नई दिल्ली – 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI-110002
www.bis.gov.in www.standardsbis.in

June 2018 **Price Group 4**

Paper and Its Products Sectional Committee, CHD 15

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Paper and Its Products Sectional Committee had been approved by the Chemical Division Council.

This standard was originally published in 1964 and was based on data on the quality of paper made available by various organizations like Hand-made Paper Institute, Pune and from the specifications laid down by the Survey Committee appointed by the Khadi and Village Industries Commission, Bombay.

The standard was first revised in 1986 in view of technological developments. The requirement of copper number had been deleted as it was felt that the ageing property is adequately checked by the determination of drop in alpha-cellulose content and folding endurance after accelerated ageing. Further, the requirements of tear factor, breaking length, burst factor had been replaced by tear index, tensile index and burst index respectively in line with present practice.

A scheme for labelling environment friendly products known as ECO-Mark has been introduced at the instance of the ministry of Environment, Forests and Climate Change (MEF and CC), Government of India. The ECO-Mark would be administered by the Bureau of Indian Standards (BIS) under the *Bureau of Indian Standards Act,* 2016 as per the Resolution No. 71 dated 21 February 1991 and No. 425 dated 28 October 1992 published in the Gazette of the Government of India. For a product to be eligible for marking with ECO logo, it shall also carry the ISI Mark of BIS besides meeting additional optional environment friendly (EF) requirements. For this purpose, the Standard Mark of BIS would be a single mark being a combination of the ISI Mark and the ECO logo. Requirements to be satisfied for a product to qualify for the BIS Standard Mark for ECO friendliness, will be optional; manufacturing units will be free to opt for the ISI Mark alone also.

The Committee responsible for formulation of this standard decided to revise it further. In this revision, besides amalgamation of all amendments, the requirements of pH and Cobb test have been introduced. The requirement of brightness has also been upgraded.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounded off numerical values (*revised*). The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

HAND-MADE DRAWING PAPER — SPECIFICATION

(Second Revision)

1 SCOPE

This standard prescribes the requirements and methods of sampling and test for hand-made drawing paper.

2 REFERENCES

The standards listed in Annex A contain provisions which, through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of these standards.

3 TERMINOLOGY

3.1 For the purpose of this standard, the following definition in addition to those given in IS 4661 shall apply.

3.1.1 *Hand-made Drawing Paper* — Hand-made paper made of 100 percent rag pulp.

4 REQUIREMENTS

4.1 General — Hand-made drawing paper shall contain 100 percent rag pulp and be a hard tub sized, air dried paper uniform in thickness. It shall be erasable and suitable for writing with ink. Both sides of the paper shall be clean, with a rough surface, and free from hard spots and wrinkles. The surface finish shall be as agreed to between the interested parties.

4.2 The hand-made drawing paper shall also comply with the requirements given in Table 1, when tested according to the relevant test methods referred to in col 4 of the Table 1.

4.3 The hand-made drawing paper shall be subjected to accelerated ageing by heating in an oven maintained at 103°C ± 2°C for 72 h, at the end of which it shall satisfy the following conditions:

a) The paper shall retain at least 98 percent of its original alpha cellulose content.

b) The paper shall retain at least 50 percent of its original folding endurance.

Table 1 Requirements for Hand-made Drawing Paper

(*Clause* 4.2)

Sl. No. (1)	Characteristic (2)	Requirement (3)	Method of Test (4)
i)	Alpha-Cellulose content, percent Min	85	15 of IS 1060 (Part 2)
ii)	Tear index, mN. m^2/g Min	9.8	IS 1060 (Part 6/Sec 1)
iii)	Tensile index, N . m/g Min (*See* note 1)	44	IS 1060 (Part 5/Sec 6)
iv)	Burst index, kPa. m^2/g Min	2.45	IS 1060 (Part 6/Sec 2)
v)	Folding endurance, Min	2 000	IS 1060 (Part 6/Sec 3)
vi)	Erasability	To pass the test	Annex B
vii)	Moisture expansivity on relative humidity variation from 45 to 75 percent, Max	1.3	Annex C
viii)	Brightness ISO, percent, Min (*See* note 2)	80	IS/ISO 2470-1
ix)	pH	6.5 – 8	10 of IS 1060 (Part 1)
x)	One minute Cobb test g/m^2, Max	20	IS 1060 (Part 5/Sec 4)

NOTES

1 Since there is no machine direction and cross direction in hand-made drawing paper, tests may be performed on any direction of the paper

2 Not applicable in case of coloured paper and printed paper

4.4 Substance

The substance of hand-made drawing paper shall be as agreed to between the interested parties. A tolerance of ± 5 percent shall be allowed on the nominal substance, when tested in accordance with IS 1060 (Part 5/Sec 5).

4.5 Size

The sizes of hand-made drawing paper and the tolerance on the declared size shall be as given in IS 1064 or IS 10711 or as agreed to between the interested parties.

4.6 Additional Requirements for ECO Mark

4.6.1 *General Requirements*

4.6.1.1 The product shall conform to the requirements for quality and performance prescribed under 4.1 to 4.5.

4.6.1.2 The manufacturer shall produce to BIS, the environmental consent clearance from the concerned *State Pollution Control Board* (SPCB) as per the provisions of *Water (Prevention and Control of Pollution) Act*, 1974 and *Air (Prevention and Control of Pollution) Act*, 1981 along with the authorization, if required, under the *Environment (Protection) Act*, 1986 and the Rules made thereunder, while applying for ECO-Mark.

4.6.2 *Product Specific Requirements*

- Manufactured from pulp containing not less than 60 percent by mass of pulp made from materials other than bamboo, hard woods, soft woods and reed; and
- Manufactured from pulp made from 100 percent waste paper.

5 PACKING AND MARKING

5.1 The hand-made drawing paper shall be packed suitably as agreed to between the buyer and the supplier.

5.1.1 For ECO-Mark, the product shall be packed in such packages which shall be recyclable/reusable or biodegradable

5.2 Marking

5.2.1 Each package shall be marked with the following particulars:

a) Description of the material, including size of sheet;
b) Substance, in g/m^2;
c) Number of sheets (in the package) and net mass of the package;
d) Batch number;
e) Month and year of manufacture; and
f) Name of manufacturer and trade-mark, if any.

5.2.2 For ECO-Mark, following additional information may also be marked on the container/package:

The criteria for which the product has been labelled with ECO-Mark.

5.2.3 *BIS Certification Marking*

Each package may also be marked with the Standard Mark.

5.2.3.1 The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act,* 2016 and the Rules and Regulations made thereunder. The details of the conditions under which the licence for use of the Standard Mark may be granted to manufactures or producers may be obtained from the Bureau of Indian Standards.

6 SAMPLING

Representative samples for the test shall be drawn as given in 3 of IS 1060 (Part 1)

7 CRITERIA FOR CONFORMITY

7.1 Number of Tests

The test shall be conducted as prescribed in IS 1060 (Part 1).

7.2 The lot shall be declared as conforming to the requirements of this standard if all the test results meet the relevant requirements.

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
IS 789 : 1971	Ink, drawing, waterproof, black (*first revision*)
IS 1060	Methods of sampling and test for paper and allied products
IS 1060 (Part 1) : 1966	Methods of sampling and test for paper and allied products: Part 1 (*Revised*)
IS 1060 (Part 2) : 1960	Methods of sampling and test for paper and allied products: Part 2
IS 1060 (Part 5)	Methods of sampling and test for paper and allied products: Part 5 Methods of test for paper and board
IS 1060 (Part 5/Sec 4) : 2014/ ISO 535 : 1991	Methods of sampling and test for paper and allied products: Part 5 Methods of test for paper and board, Section 4 Determination of water absorptiveness — Cobb method
IS 1060 (Part 5/Sec 5) : 2014/ ISO 536 : 2012	Methods of sampling and test for paper and allied products: Part 5 Methods of test for paper and board, Section 5 Determination of grammage
IS 1060 (Part 5/Sec 6) : 2014/ ISO 1924-2 : 2008	Methods of sampling and test for paper and allied products: Part 5 Methods of test for paper and board, Section 6 Determination of tensile properties — Constant rate of elongation method (20 mm/min)
IS 1060 (Part 6)	Methods of sampling and test for paper and allied products: Part 6 Methods of test for paper
IS 1060 (Part 6/Sec 1) : 2014/ ISO 1974 : 2012	Methods of sampling and test for paper and allied products: Part 6 Methods of test for paper, Section 1 Determination of tearing resistance — Elmendorf method
IS 1060 (Part 6/Sec 2) : 2014/ ISO 2758 : 2001	Methods of sampling and test for paper and allied products: Part 6 Methods of test for paper, Section 2 Determination of bursting strength of paper
IS 1060 (Part 6/Sec 3) : 2015/ ISO 5626 : 1993	Methods of sampling and test for paper and allied products: Part 6 Methods of test for paper, Section 3 Determination of folding endurance of paper
IS 1064 : 1980	Paper standard sizes (*second revision*)
IS/ISO 2470 (Part 1) : 2009	Paper, board and pulps — Measurement of diffuse blue reflectance factor: Part 1 Indoor daylight conditions (ISO Brightness) (*second revision*)
IS 4661 : 1999	Glossary of terms used in paper trade and industry (*second revision*)
IS 10711 : 2001/ ISO 5457 : 1999	Technical product documentation — Sizes and layout of drawing sheets (*first revision*)

ANNEX B

[*Clause* 4.2, and *Table* 1, *SI No.* (VI)]

ERASABILITY TEST

B-1 MATERIALS

B-1.1 Drawing Ink, Black — Conforming to IS 789.

B-1.2 Steel Eraser

B-2 PROCEDURE

B-2.1 Draw a line, 0.8 mm thick, with black drawing ink using the drawing pen. After drying, rub off the line completely with the steel eraser. Then smoothen the surface and again draw a similar line at the same place and erase again. Draw a third line at the same place after smoothening once again.

B-2.2 The paper is deemed to have passed the test if the third line drawn does not show any feathering.

ANNEX C

[*Clause* 4.2 and *Table* I, *Sl No.* (vii)]

DETERMINATION OF MOISTURE EXPANSIVITY OF PAPER

C-1 PRINCIPLE OF METHOD

C-1.1 Moisture expansivity is indicated by expansion or contraction with increase or decrease of moisture content, respectively. Practically the same value is obtained by measuring either contraction or expansion, if the conditions are properly controlled. For convenience, the expansivity is determined by measuring contraction.

C-1.2 The changes in length of one or more specimens of paper are produced by controlled variations of the relative humidity and measured either by means of an optical lever or any method of equivalent accuracy.

C-2 APPARATUS

C-2.1 The apparatus consists of a cabinet of suitable design as shown in Fig. 1. Its inside dimensions are approximately 100 cm high, 40 cm wide and 30 cm deep. When the optical lever method is used, the cabinet is provided with a fan to circulate the air and is so divided that the air will flow from the fan over a chemical or solution used to control the humidity, then over the test specimen on the return to the fan. The air flow around the specimen should not be less than 150 metres per minute. If constructed of wood, the cabinet should be coated inside and outside with a

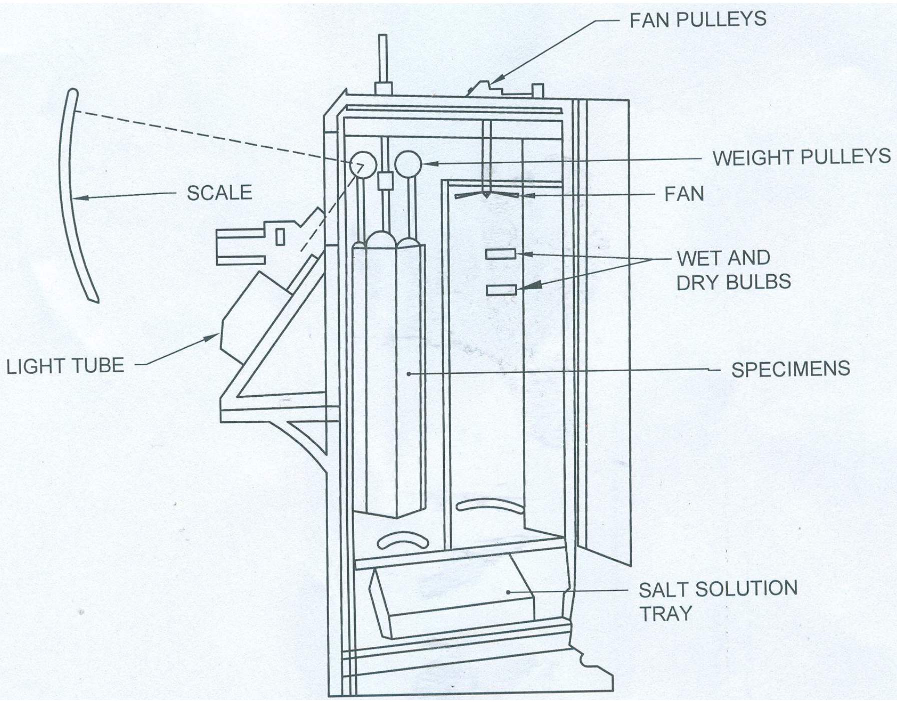

FIG.1 VIEW OF OPEN CABINET WITH SPECIMEN IN PLACE

NOTE — The following substances are recommended for control of humidity:

Substance	*Ascribed Relative Humidity, Percent*
a) Potassium sulphate (saturated solution)	95.0
b) Barium chloride (saturated solution)	88.0
c) Sodium chloride (saturated solution)	75.8
d) Sodium bromide (saturated solution)	38.0
e) Sodium dichromate (saturated solution)	52.0
f) Potassium carbonate (saturated solution)	43.0
g) Magnesium chloride (crystals)	33.0
h) Calcium chloride (solid)	< 5.0

moisture-resistant coating. If the cabinet is constructed of metal, it should be insulated. The entire front of the cabinet may be hinged to form a door which should be divided at the top of the bottom compartment so that the chemical solution trays may be interchanged without opening the rest of the cabine.

C-2.2 Using the optical lever, the test specimen is mounted vertically between a fixed clamp at the bottom and a loading clamp at the top. A light flexible cable leads from the loading clamp over a pulley to a suspended mass which applies tension to the specimen. A mirror is mounted on the pulley shaft. This mirror forms a part of the optical lever which indicates the changes of length of the specimen under test. Movement of the mirror through rotation of the shaft changes the position of spot of light reflected by the mirror to a curved scale graduation in millimetres. The radius of curvature of the scale is the distance of the mirror from the scale. The mirror should be readily adjustable on the shaft to facilitate marking a zero setting.

C-2.3 Light from the source of suitable illumination is admitted through a 3.2 mm circular aperture with a horizontal cross-hair and is focussed upon the mirror by a 5cm double convex lens. The mirror is mounted at an angle to reflect the beam of light upon the scale where the image of the cross-hair forms a reading line. The beam originates from a tube made in two sections, telescoped one within the other, to permit moving the section containing the lens so as to adjust the focus on the mirror to obtain a sharp image on the scale. The sections are 10.2 cm in length, telescoped to form a tube approximately 15 cm long.

C-2.4 For measuring relative humidity and temperature in the apparatus, wet and dry bulb thermometer or mechanical humidity display device (Hygrometer) or digital temperature and humidity display device shall be used.

C-2.5 Each pulley shaft is mounted on antifriction bearings.

C-2.6 The light tube is so placed that the lens is approximately 19 cm from the mirror. The cross-hairs is a copper wire 0.27 mm in diameter, and the lens is from an ordinary hand reading glass, having a focal length of 12.48 cm.

C-2.7 The apparatus shown in Fig. 1 is constructed for testing eight specimens simultaneously. The specimens are arranged around a central spindle on which are mounted the brackets holding the bottom clamps and the loading pulleys. Each specimen has an independent loading arrangement and mirror, but a single light source is utilized by turning the spindle to bring any selected specimen into a position where its mirror is in the light beam to reflect the image of the cross-hair on the scale. The end of the spindle projects through the top of the cabinet to provide a convenient means of rotating it without disturbing the testing conditions.

C-3 The tension on a test specimen is equal to the difference between the total load applied to the test specimen and the load required to move the upper jaw. Hence the latter should be checked at intervals of not more than 30 days. To do so, reduce the weight to the point where the upper jaw, without test specimen, is balanced; then add weight very slowly until the jaw moves. This may be done conveniently by adding weight in the form of small shot.

C-3.1 To check for accuracy of the scale readings, calculate the value of the scale division, using the ratio of the radius of the pulley plus half the thickness of the band around the pulley, to the distance of the mirror from the scale. Alternatively, compare the scale readings with measured travels of the upper jaw. Place a metal tape in the same position as a test specimen. Raise or lower the lower jaw and measure its movement with a micrometre caliper. Compare the actual movement with the scale reading.

C-4 TEST SPECIMEN

Cut the specimens for test, whenever possible, 50 cm wide and 63.5 cm long; and with the long dimension parallel to the major direction for which data are required. If it is necessary to use smaller specimens, their dimensions and the testing length shall be stated in the report. The specimens shall be cut with the edges clean and parallel.

C-5 PROCEDURE

C-5.1 Clamp the specimen firmly in place, with the distance between clamps (testing length) 60 cm and under a tension of 19.7 g/cm width. Condition it first at a relative humidity of approximately 40 percent or lower, then at approximately 80 percent or above. When the length becomes constant at the higher humidity, adjust the position of the mirror to give a zero setting.

C-5.2 Obtain data for an expansion curve by conditioning to constant length at two or more successively lower humidity to 40 percent or lower. Make humidity determinations and scale readings for each condition.

C-5.3 Plot the changes in length against relative humidity and, from the curve, determine the decrease in length with change from 75 percent relative humidity to 45 percent relative humidity. Data on one specimen are sufficient for an ordinary test but if a smooth curve is not obtained, make a check test. During the test, the temperature shall not be less than 25°C nor more than 29°C.

C-6 PRECISION

The reproducibility of the test results is within 2 percent.

C-7 REPORT

Report the expansivity, to two decimal places, as the percentage change of length for a decrease from 75 percent relative humidity to 45 percent relative humidity. The report shall also state whether the expansivity is in the machine direction or in the cross direction of the paper. If it is necessary to use a smaller test specimen than the specified, its dimensions shall be stated.

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act*, 2016 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publications), BIS.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

This Indian Standard has been developed from Doc No.: CHD 15 (11557).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402 *Website*: www.bis.gov.in

Regional Offices:		*Telephones*
Central	: Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	2323 7617 2323 3841
Eastern	: 1/14 C.I.T. Scheme VII M, V.I.P. Road, Kankurgachi KOLKATA 700054	2337 8499, 2337 8561 2337 8626, 2337 9120
Northern	: Plot No. 4-A, Sector 27-B, Madhya Marg CHANDIGARH 160019	265 0206 265 0290
Southern	: C.I.T. Campus, IV Cross Road, CHENNAI 600113	2254 1216, 2254 1442 2254 2519, 2254 2315
Western	: Manakalaya, E9 MIDC, Marol, Andheri (East) MUMBAI 400093	2832 9295, 2832 7858 2832 7891, 2832 7892

Branches : AHMEDABAD. BENGALURU. BHOPAL. BHUBANESHWAR. COIMBATORE. DEHRADUN. DURGAPUR. FARIDABAD. GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR. JAMMU. JAMSHEDPUR. KOCHI. LUCKNOW. NAGPUR. PARWANOO. PATNA. PUNE. RAIPUR. RAJKOT. VISAKHAPATNAM.

Published by BIS, New Delhi